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DEVICE FOR A GUARD PLATE OR DRAINAGE PLATE  
[VORRICHTUNG BEI EINER SCHUTZPLATTE ODER DRÄNAGENPLATTE]

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## Description

### Area Covered by Invention

This invention relates to a device for a guard plate or drainage plate, especially a plate that has hollow cams [cogs] or bulges that protrude out of the main plane of the plate, and whereby especially the plate extends in a water storage system, resting with the peaks of the cams on a support and turning the cam openings upward to receive precipitation.

### Background of Invention

To have so-called "green roofs," it is necessary, due to the comparatively thin greenery medium layer, to make sure that the moisture is retained. For this purpose, there are some vacuum-shaped plastic products on the market where, after filling up the water storage part, one wishes to remove the "overflow" and to make sure that the latter will then also drain toward the eaves gutter and the drain pipe in the usual fashion.

### State of the Art

Vacuum-shaped products for this purpose are often produced in the form of plates that look like an "egg tablet." These plates are placed on the roof, which, first of all, is provided with a customary roof covering and, thereupon, with a special layer that is intended to prevent the formation of roots on the roof covering. Then a filter fleece is placed on the vacuum-

shaped plates and thereupon the growth media and finally the actual planting.

In the vacuum-shaped plants that are on the market today, the overflow holes are attached on the very top upon the flat part of the plate so that the filter fleece will be in direct contact with these holes. This close contact between the drainage holes and the filter fleece/growth medium is unfavorable because the filter fleece is filled with very fine substance particles and interferes with the drainage capacity, while at the same time there is the risk of root formation in the drainage hole.

#### Statement of Invention

The object of the invention is to eliminate the above-described disadvantages.

According to the invention, this is achieved by a device of the kind indicated in the introduction, which is characterized by the following: In the area of the main plane of the plate, there are arranged channel-shaped depressions that extend between the cam openings and, in the channel-shaped depressions, there are provided drainage openings for the purpose of removing excess water out of the cam cavities on a level below the main plane of the plate.

In a practical manner, the device can be adapted to a guard plate or drainage plate, which is so shaped that the cams will

have the shape of hollow truncated cones or pyramids, possibly with parts of the cam peaks being folded back toward the main plane of the plate and that the channel-shaped depression extend in arbitrary directions between the cam openings, preferably in a straight angular relationship with each other.

In this connection, it is practical that the channel-shaped depressions have an edge-shaped or well-shaped profile and that the drainage openings are made as slit-shaped openings that extend mainly laterally with respect to the longitudinal direction of the channels.

Depending on the drainage capacity of the invention at hand, the slit-shaped openings can be arranged mainly in every other channel between the neighboring cam openings.

With this kind of shape of a device for a guard plate or drainage plate, a characterizing feature has the goal of making sure that in the main plane of the plate between neighboring cam opening edges and channel edges, there will be cruciform plateaus, which will form a support for the superposed material, for example, a filter fleece.

Another feature of the invention has the objective of using the device for a plate that, for example, is arranged on a roof with a superposed roof covering and a layer to prevent root formation in the roof covering, and that, on the plate, there is

arranged a filter fleece that supports the growth medium and the actual planting.

Other features and advantages of the invention will be found in the following description in conjunction with the attached drawings.

#### Brief Description of Figures in Drawings

Fig. 1 shows a schematic view of a known form of a guard plate or drainage plate that is used as water storage and as drainage element for so-called "green roofs" for correspondingly planted areas.

Figs. 2, 3 and 4 show various embodiments for known guard plates that are used for the abovementioned purposes and that comprise cams or bulges, which face upward from the main plane of the plate and which are provided on the peaks with drainage holes.

Fig. 5 shows as schematic view of an example of an invention-based device used as water storage and drainage element for green roofs.

Fig. 6 shows a perspective view of an example of how to use the invention-based device in accordance with Fig. 5.

Fig. 7 shows a plan view of an embodiment of the invention-based device.

Fig. 8 shows a profile through the device according to Fig. 7.

## Description of Embodiments

The invention at hand was developed in conjunction with so-called "green roofs," but it can be used generally in conjunction with foundation supports that are to be protected against moisture but that are to be planted with greenery. In conjunction with such systems, it is important to make sure that the comparatively thin layer with growth medium will retain a suitable volume of moisture. In conjunction with such a system, some vacuum-shaped plastic products were therefore introduced on the market where, after filling up the water supply, one wishes to evacuate the excess water, and this excess water is then

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returned in the usual manner to the eaves gutters and the drain pipes.

Figs. 1, 2, 3 and 4 are examples of vacuum-shaped products in the form of plates 1a, 1b, 1c, 1d that look mainly like an "egg tablet." These plates, for example, are placed on a roof 2, which first of all was provided with a customary roof covering 3 and, thereupon, a special layer 4 that is intended to prevent the formation of roots in the roof covering. Upon the vacuum-shaped plates 1a-1d, which in a suitable manner is assembled together with a drainage material 5a, one then puts a filter fleece 5 and, thereupon, one applies growth medium 6 in which plants 7 can grow.

As one can see in the mentioned figures, the drainage holes or overflow holes 8 are attached on top, on the flat part of the plate, see especially Fig. 4, whereby five holes are arranged in the cams in each upper surface. As a result, the filter fleece 5 that is placed over the cam surfaces comes to rest in direct contact with the mentioned holes, something that is shown especially in Fig. 1. This intimate contact between drainage hole and filter fleece/growth medium is very unfavorable because the filter fleece is inclined to be filled up with fine substance particles and thus hinders the drainage capacity, while at the same time there is the risk of root formation in the drainage hole.

Figs. 5-8 show how the invention solves the abovementioned problem, which solution guarantees an improved and secure drainage capacity.

According to the invention, we thus have a device for a guard plate or drainage plate 11, in particular, a plate that comprises hollow cams or bulges, which protrude out of a main plane 13 of the plate 11, whereby especially plate 11 passes into a water storage system with cam peaks 12a, the rest on a foundation 2,3,4, and with can openings 12b, that in order to receive perceptions that protrude upward to receive precipitation, which [system] according to the invention comprises the characterizing features so that in the area of the



main plane 13 of the plate, there are arranged channel-shaped depressions that extend between the cam openings 12b, and that in the channel-shaped depression 14, there are provided drainage openings 15 to remove excess water out of the cam cavities to a level below the main plane of the plate.

As other words, as indicated in Figs. 5-8, the object of the invention is to make sure that the drainage holes 15 will lie below the peak or the main plane 13 of the plate 11, which means that the filter fleece 5, and therefore also the growth medium 6, will lie at an interval from the abovementioned drainage openings or drainage holes 15. Furthermore, the individual drainage hole 15 is made like a big slit, and this form of opening is better secured against a blockage in case of any possible root breakthrough through the filter fleece 5.

It can be seen especially in Fig. 7 that by virtue of the special design of the device, which is shown in this figure, the plate is so shaped that in the main plane 13 of the plate between neighboring cam opening edges 12c and channel edges 14c, there will be shaped mainly cruciform plateaus 16 that form a support for the superposed material, especially a filter fleece 5 with superposed growth medium 6. These large cruciform surfaces 16 ensure a good support for the filter fleece and furthermore contribute to the fact that the filter fleece will

not sink to the level of the drainage openings 15 or their subjacent channel-shaped depressions 14, which extend in arbitrary directions between the cam openings 12b.

Fig. 6 shows a practical use of the invention-based device, specifically for a plate 11 that is attached on a roof 2 with superposed roof covering 3 and a layer 4 to prevent root formation in the roof covering and that simultaneously, as on plate or plates 11, there is arranged a filter fleece 5, which supports the growth medium 6 and the actual planting 7.

#### Claims

1. Device for a guard plate or drainage plate (11), in particular, a plate with hollow cams or bulges (12) that protrude out of the main plane (13) of plate (11), whereby especially plate (11) passes into a water storage system with cam peaks (12a) resting on a support and with cam openings (12b) to receive precipitation and bending upward, **characterized in** that in the area of the main plane (13) of the plate, there are arranged channel-shaped depressions (14) that extend between the cam openings (12b), and that in the channel-shaped depressions (14), there are provided drainage openings (15) to remove excess water out of the cam cavities (12b) on the level below the main plane of the plate.

2. Device according to Claim 1, characterized in that the cams have the shape of hollow truncated cones or pyramids,

possibly with parts of cam peaks folded back to the main plane of the plate, and that the channel-shaped depressions extend in arbitrary directions between the cam openings, preferably in a straight angular fashion in relation to each other.

3. Device according to Claim 1 or 2, characterized in that the channel-shaped depressions (14) have an edge-shaped or well-shaped profile, and that the drainage openings are shaped as slit-shaped openings that extend mainly laterally with respect to the longitudinal direction of the channels.

4. Device according to Claims 1-3, characterized in that the slit-shaped openings (15) are arranged mainly in every other channel between the neighboring cam openings.

5. Device according to one of the above claims, characterized in that in the main plane (13) of the plate between neighboring cam opening edges (12c) and channel edges (14c), there are arranged mainly cruciform plateaus (16) that form a foundation for the superposed material, for example, a filter fleece (5).

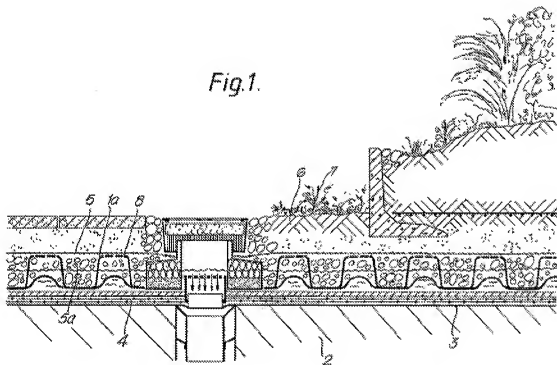
6. Device according to one of the above claims, characterized in that the device is used for a plate (11), which, for example, is arranged on a roof (2) with a superposed roof covering (3) and a layer (4) to prevent root formation in the roof covering and that, on plate (11), there is arranged a

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filter fleece (5), which supports the growth medium (6) and the planting (7).

4 pages of drawings

*Fig.1.*



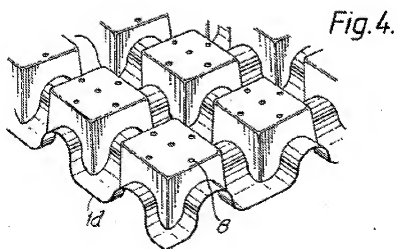
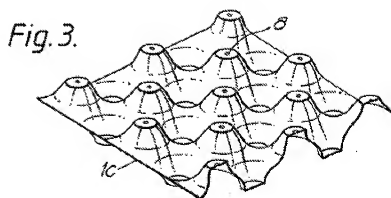
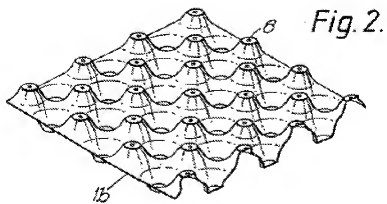


Fig.5.

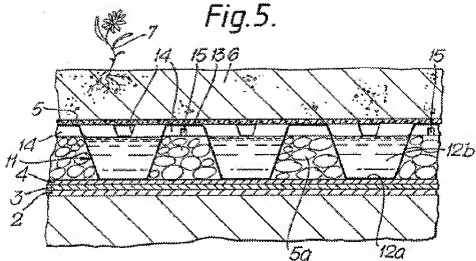


Fig.7.

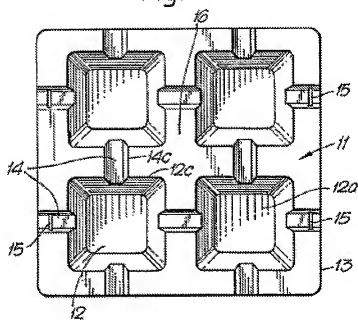


Fig.8.



Fig.6.

